

Purpose: To describe a man with an adherent tick mimicking a melanoma, summarize the salient features of this condition, and review other cases of ticks mistaken for dermatoses. **Background:** Ticks are obligatory ectoparasites. Disease-causing ticks belong to two families: *Ixodidae* (hard ticks) and *Argasidae* (soft ticks). Ticks thrive by consuming blood from animal hosts, and the transfer of infected blood from one host to the next is the method by which ticks spread disease. **Materials and methods:** The authors describe a man who presented to their dermatology clinic in New York with an unusual black pigmented lesion on the right zygomatic region of his face. He was worried about how rapidly the lesion had developed and the tingling of the skin surrounding it. Since the patient had a history of nonmelanoma skin cancer, he was concerned that the lesion was a melanoma. An excisional biopsy of the lesion revealed a non-*Ixodes* tick with a surrounding tick-bite reaction. **Results:** Ticks cause cutaneous manifestations through physical trauma and their salivary contents. A number of reports describe a similar phenomenon of a persistent tick being mistaken for a nodule or tumor. Management

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Ticks and Tick Bites Presenting as “Funny Moles”: A Review of Different Presentations and a Focus on Tick-borne Diseases

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Ticks are blood-sucking arachnids that are known to cause a wide variety of dangerous blood-borne illnesses.

However, many cases of tick infestation simply present as a pigmented papule (the tick itself) with minimal surrounding erythema. A man presented to the authors' dermatology clinic in New York with a persistent tick on the right zygomatic region of his face that he had mistaken for a new melanoma. This case illustrates the importance of keeping insects and arthropods in the differential diagnosis

of a sudden- and recent-onset pigmented skin lesion.

CASE REPORT

A 79-year-old man presented to the authors' dermatology clinic with a black pigmented lesion on the right zygomatic region of his face (Figures 1 and 2). The lesion had developed suddenly and persisted for the past two weeks. He mentioned that the surrounding area was quite sensitive to palpation. Since the patient had a history of nonmelanoma skin cancer, he was concerned that this was a

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includes complete removal of a tick, either mechanically or surgically, along with the appropriate work-up for tick-borne diseases in the relevant geographic location. The decision to test for systemic disease depends on the clinical presentation of the patient and geographic location of the tick bite. **Conclusion:** A patient presented to the authors' dermatology clinic with a pigmented lesion suspicious for a melanoma, but the lesion was actually an adherent non-*Ixodes* tick. This case illustrates the importance of keeping insects and arthropods in the differential diagnosis of a sudden- and recent-onset pigmented skin lesion.

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Figure 1. A 79-year-old man presents with a black nodule on the right zygomatic region of his face with minimal surrounding erythema



Figure 2. A closer view of the black nodule on the right zygomatic region of a 79-year-old man

melanoma. On close inspection with a dermatoscope, the “melanoma” actually appeared to be an adherent tick. A small excision of the area where the tick was embedded was performed, and two superficial 6.0 Nylon sutures were placed. Histopathology of the sample revealed a non-*Ixodes* tick. Festoons were visualized, which are rectangular grooves seen on the caudal edge of some hard ticks, but not including the *Ixodes* genus.¹ There was a surrounding tick-bite reaction composed of deep perivascular infiltrate and eosinophils. Given the diagnosis, Rocky Mountain Spotted Fever (RMSF) and Lyme disease titers were conducted. The Lyme disease antibody screen was negative, but the RMSF immunoglobulin (Ig)M and IgG titers were mildly reactive at 1:64. The patient was started on oral

doxycycline 100mg twice daily for 21 days. Repeat RMSF antibodies were negative.

DISCUSSION

Ticks are members of kingdom *Animalia*, phylum *Arthropoda*, subphylum *Chelicerata*, class *Arachnida*, subclass *Acari*, superorder *Parasitiformes*, order *Ixodida*, and superfamily *Ixodoidea*. These creatures thrive by consuming blood from animal hosts (obligatory ectoparasites); the transfer of infected blood from one host to another is the method by which ticks spread disease. The medically relevant disease-causing ticks belong to two families: *Ixodidae* (hard ticks) and *Argasidae* (soft tick). Only a few genera within these two families are known to infect animals and humans; some genera of hard ticks include *Amblyomma*, *Dermacentor*, *Ixodes*, and

Rhipicephalus. The incidence of tick-borne disease is about 100,000 per year and includes conditions such as African tick typhus, anaplasmosis, babesiosis, Colorado tick fever, Crimean-Congo hemorrhagic fever (CCHF), ehrlichiosis, Lyme borreliosis, Q fever, RMSF, Russian spring summer encephalitis (TBE), and tularemia.²

The clinical manifestations of tick bites are numerous and depend on the specific species. Ticks cause cutaneous manifestations through physical trauma and immune reaction to their salivary contents.³ Within a few days of attachment, both hard and soft ticks can cause erythematous macules, papules, nodules, and ulcers. Soft ticks can result in more serious skin manifestations, including bullae and tissue necrosis. Over time, tick bite granulomas (caused by foreign body reactions to the tick or tick remnants), alopecia (with a tick bite to the scalp), lichenification, and secondary infection with *Staphylococcus aureus* or Group A *Streptococcus* may occur. Immunoglobulin E (IgE)-dependent anaphylaxis and urticaria may even occur away from the site of the tick bite. Toxin-induced tick paralysis has also been reported.⁴ Risk factors include outdoor activities such as animal contact, camping, grass exposure, and hiking; infections may also occur in residential areas during routine activities.⁵ Some patients, as in the current case, present to the dermatology clinic with a tick adherent to their skin with little to no clinical

manifestations of tick-borne disease.

The systemic illnesses caused by ticks in the United States depend on the genus, species, and the geographic location. The American dog tick (*Dermacentor variabilis*) is found east of the Rocky Mountains and on the Pacific coast; it causes *Rickettsia rickettsii*-induced RMSF and tularemia. The Rocky Mountain wood tick (*Dermacentor andersoni*), which is actually found in the Rocky Mountains, also causes these conditions. The brown dog tick (*Rhipicephalus sanguineus*), found in the Southwest, has recently been shown to also transmit *R. rickettsia*. The blacklegged tick (*Ixodes scapularis*), also known as a “deer tick,” is found in the Northeast and Midwest and causes anaplasmosis, babesiosis, and Lyme disease. The western blacklegged tick (*Ixodes pacificus*) of the Pacific coast can also cause these conditions. The Gulf Coast tick (*Amblyomma maculatum*) is found along the Atlantic coast and the Gulf of Mexico and results in another form of spotted fever caused by *Rickettsia parkeri*. The lone star tick (*Amblyomma americanum*), found in the Southeast and East, causes ehrlichiosis, tularemia, and southern tick-associated rash illness (STARI).⁶

Interestingly, a number of reports describe a tick being mistaken for a pigmented nevus, seborrheic keratosis, or even a melanoma. One report describes a 43-year-old man referred for

biopsy of a pigmented skin lesion on his abdomen. The patient mentioned that he had noticed the lesion approximately two weeks ago, perhaps during a picnic. It had grown larger and more pruritic over the weeks. Clinical examination revealed a 4×3×2mm dark black, well-demarcated lesion with surrounding erythema. The lesion was neither ulcerated nor bleeding and was devoid of satellite lesions. The authors recognized the lesion as a tick and carefully removed it. Histopathological analysis had confirmed their suspicion.¹

Another case report describes a 54-year-old Caucasian man who had a five-week history of agonizing pain in a “mole” on his left inner thigh. The clinician who had examined the lesion initially believed that it was a traumatized, papillomatous nevus. However, biopsy showed the body parts of a hard tick. This case demonstrates that a blood-engorged tick can clinically mimic a traumatized or infarcted skin growth.⁷

In an article titled, “Tick simulating a traumatized or infarcting skin growth—ticks can trick,” Baruchin et al report two cases of ticks mimicking cutaneous neoplasms.⁸ One was a 58-year-old Caucasian woman with a 0.9cm purple-black nodule on her forehead that was present for 11 days. The nodule appeared to clinically resemble a papillomatous nevus from afar. Upon closer inspection, this was really a partly engorged female *Ixodes redikovezi* tick. Their second patient was a 75-year-old woman from a farming

town with a slowly growing nodule in her left axilla that was present for about one week. Further inspection and subsequent removal confirmed the presence of a tick.

There are many cases where a tick has been mistaken for a dermatosis. Interestingly, the converse may also be true; in some cases, the finding of a tick on a patient (along with systemic symptoms) may lead clinicians astray from a completely unrelated medical condition. For example, a 13-year-old Turkish boy presented with an adherent tick on his back along with fever and splenomegaly. The preliminary diagnosis was tick-borne Crimean-Congo hemorrhagic fever (CCHF). The laboratory results on admission showed anemia, thrombocytopenia, elevation of acute phase reactants, and elevated liver transaminase levels, all suggesting CCHF. However, the CCHF PCR analysis was negative, and the fever did not resolve with the indicated treatment. Further medical history revealed stockbreeding and consumption of raw milk products. The clinicians realized that his signs and symptoms were also compatible with brucellosis. A standard tube agglutination test for brucellosis was positive at 1/1280 titer in serum. The initial diagnosis of CCHF was incorrect. The patient was treated for brucellosis with a combination of rifampicin (1x600mg/day) and doxycycline (2x100mg/day).⁹ This is an example of a patient presenting with an adherent tick, but afflicted with a completely unrelated

pathology. Indeed, “ticks can trick” in more ways than one.

Multiple reports describe a tick adherent in an unusual location, such as the eyelid. For example, a 40-year-old Caucasian woman presented with an *Ixodes* tick on her left lower eyelid after a camping trip in Norfolk, England. For this patient, visual acuity was unaffected, intraocular pressures were within normal limits, and anterior and posterior segment examinations were benign. The patient was not prescribed medications and did not require follow-up.¹⁰ Another report describes a three-year-old girl with a small brown lesion on her right upper eyelid who was asymptomatic. Gross and microscopic examination of the specimen identified the organism as *Ixodes ricinus*. The tick was completely removed with blunt forceps; the lesion healed without scarring after one week.¹¹

Tick removal should be performed carefully by the clinician. One Emergency Medicine text describes a four-step mechanical approach.¹² First, viscous lidocaine is applied onto the tick to weaken its adherence to the patient’s skin. Baruchin et al add chloroform onto the head of the tick for the same purpose.⁸ Lidocaine also serves to anesthetize the region. Second, the tick’s head must be gently grasped with fine-tipped tweezers or forceps such that rupture of the tick is avoided. If the adherent tick is removed too vigorously, the mouth parts are often left in the patient. This can lead to secondary infection,

granuloma formation, or ulceration. Third, all remaining parts of the tick are removed; superficial dissection is used as necessary. Fourth, after complete removal, the region is cleansed and disinfected.¹² The mechanical approach to tick removal is minimally invasive, but there is a large risk of tick remnants being left in the site.

The surgical approach to tick removal is more invasive, but is more certain to completely remove the tick. Excision avoids squeezing or crushing the tick so that remnants are not left in the patient.¹³ In this case, a punch biopsy of the site of the tick bite or elliptical excision is performed.¹⁴

The need for further testing for tick-borne systemic illnesses depends on the clinical presentation and geographic location. Serologic testing for Lyme disease constitutes the measurement of antibodies to *Borrelia burgdorferi* via enzyme-linked immunosorbent assay (ELISA). Positive or equivocal ELISA tests are confirmed by Western blot. Since IgM antibodies to *B. burgdorferi* take one to two weeks to form and IgG antibodies take two to six weeks, serology is not ideal. In fact, the pathognomonic diagnosis of Lyme disease is the observation of cutaneous erythema chronicum migrans on physical examination. Serologic testing should only be performed if the patient visited an endemic region, had an exposure to a tick, and has symptoms consistent with Lyme disease. Lyme disease antimicrobial prophylaxis is needed if all of the

following criteria are met: the attached tick is identified as *Ixodes scapularis* (the deer tick), the tick was adherent for 36 or more hours, no more than 72 hours has passed since the tick has been removed, the estimated local rate of infection of ticks carrying *B. burgdorferi* (the bacteria that causes Lyme disease) is 20 percent or greater (often the case in New England), and doxycycline is not contraindicated.¹⁵ Antibiotic prophylaxis consists of a one-time oral dose of 200mg of doxycycline.

Further management of anaplasmosis, babesiosis, ehrlichiosis, RMSF, STARI, and tularemia also depends on the clinical presentation of the patient and epidemiological setting of the tick bite, especially because there is no accurate laboratory method for detection in the early stages of these diseases.

CONCLUSION

Ticks are blood-sucking arachnids known to cause many blood-borne illnesses. Ticks cause bite reactions through physical trauma and their salivary contents. The clinical manifestations of tick bites are numerous and depend on the specific species, but many ticks adhere to patients without causing symptoms. A 79-year-old man presented with a non-*Ixodes* tick latched onto the right zygomatic region of his face; he had mistaken it for a melanoma. A number of reports describe a similar phenomenon of a persistent tick being mistaken for a dermatosis, neoplasm, or nodule. Moreover, the converse

has also been described: the discovery of a tick on a patient has lead clinicians away from a completely unrelated medical condition. Management includes complete removal of a tick. Mechanical removal employs gentle traction with fine-tipped tweezers or forceps and care not to leave tick remnants in the patient. Surgical removal may be performed via a punch biopsy or elliptical excision. The decision to test for systemic disease depends on the clinical presentation of the patient and geographic location of the tick bite.

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